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Y Chromosome Haplotype Analysis in Portuguese Cattle Breeds Using SNPs and STRs

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Abstract

DNA samples from 307 males of 13 Portuguese native cattle breeds, 57 males of the 3 major exotic breeds in Portugal (Charolais, Friesian, and Limousin), and 5 Brahman (*Bos indicus*) were tested for 5 single nucleotide polymorphisms, 1 "indel," and 7 microsatellites specific to the Y chromosome. The 13 Y-haplotypes defined included 3 previously described patrilines (Y1, Y2, and Y3) and 10 new haplotypes within *Bos taurus*. Native cattle contained most of the diversity with 7 haplotypes (H2Y1, H3Y1, H5Y1, H7Y2, H8Y2, H10Y2, and H12Y2) found only in these breeds. H6Y2 and H11Y2 occurred in high frequency across breeds including the exotics. Introgression of Friesian cattle into Ramo Grande was inferred through their sharing of haplotype H4Y1. Among the native breeds, Mertolenga had the highest haplotype diversity (0.68 ± 0.07), Brava de Lide was the least differentiated. The analyses of molecular variance showed significant ($P < 0.0001$) differences between breeds with more than 64% of the total genetic variation found among breeds within groups and 33–35% within breeds. The detection of *INRA189*-104 allele in 8 native breeds suggested influence of African cattle in breeds of the Iberian Peninsula. The presence in Portuguese breeds of Y1 patrilines, also found in aurochs, could represent more ancient local haplotypes.

Key words: *cattle, haplotypes, Y chromosome*